REMARKS

Claim Rejections – 35 USC §102

The Examiner rejected claim 1 under 35 USC §102(a) over U.S. Patent No. 6,297,844 to Shatz ("Shatz"). The Examiner indicated that Shatz discloses "generating a control signal that triggers an alarm based on the trajectory, wherein the alarm could control an object's motion…". The Examiner erroneously indicated that Shatz therefore reads on "generating a control signal influencing said object's motion in response to said trajectory" as particularly claimed in claim 1.

Contrary to the Examiner's characterization, Applicants respectfully submit that generating a signal that triggers an alarm as disclosed in Shatz is distinct from "generating a control signal influencing said object's motion" as presently claimed. Persons having ordinary skill in the art should appreciate that, while generating an alarm signal or triggering an alarm is a common output of many detection systems, nothing about alarm systems generally teaches or suggests a control signal influencing said objects motion as particularly claimed. Since alarm signals do not teach or suggest influencing an object's motion, Applicants respectfully submit that Shatz does not teach each and every element of claim 1 as particularly claimed. Additionally, claim 1 is amended herewith to recite further features emphasizing such patentable distinctions over the cited prior art, as discussed in detail hereinafter. Accordingly, Applicants respectfully submit that the rejection under 35 USC §102 is therefore is improper and must be withdrawn.

Claim Rejections – 35 USC §103

The Examiner rejected claims 14 and 16 under 35 USC §103(a) over Shatz.

Regarding claim 14, Applicants respectfully submit that claim 1 from which claim 14 depends is amended herein to include each of the limitations of claim 2. The Examiner has admitted that "Shatz fails to specifically disclose the details of computing 3-D features" as claimed in claim 2." (Page 5, Lines 18-20). For the reasons set forth hereinafter with respect to claim 2, Applicants respectfully submit that the rejection of claim 14 under 35 USC §103(a) has been overcome and should be withdrawn.

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Regarding claim 16, the Examiner admitted that "Shatz does not specifically disclose measuring a height of the 3-D features relative to the ground plane." The Examiner takes Official Notice "that it was extremely well known in the art to calculate the height of 3-D features." (Page 5, Line 9-10). Applicants respectfully submit that the Examiner erroneously indicated that "it was extremely well known in the art to calculate the height of 3-D features which is suggested by Shatz because the 3-D features comprise position data, which reads on 'measuring a height of said feature relative to a ground plane'..." Contrary to the Examiner's characterization, the referenced 3-D features which comprise position data as disclosed in Shatz do not read on "measuring a height of said features relative to a ground plane" as particulary claimed. Persons having ordinary skill in the art will appreciate that 3-D position data describes an object's position relative to some datum in a coordinate system but does not necessarily teach or suggest measuring a height relative to a ground plane unless the ground plane itself is defined with reference to the coordinate system. The claimed step of "measuring a height relative to a ground plane accounts for both the 3-D position data of a feature and the 3-D position of a ground plane relative to one or more coordinate systems. Applicants respectfully submit that Shatz does not teach or suggest accounting for any such relationship and therefore does not teach or suggest "measuring a height of said feature relative to a ground plane" as particularly claimed. In light of the Examiner's improper taking of Official Notice and because Shatz does not disclose each and every step of claim 16 Applicants respectfully submit that the rejection of claim 16 under 35 USC §103(a) is improper and should be withdrawn.

The Examiner rejected claims 2, 3, 9, 12 and 17 under 35 USC §103(a) over Shatz in view of Dhond et al. ("Structure from Stereo – A review"), (hereinafter referred to as "Dhond"). Applicants respectfully submit that claim 2 is cancelled herein and the limitations of claim 2 are now included in claim 1. Accordingly Applicants respectfully request that the following arguments be considered with respect to claim 1 as amended and to each of the claims which depend therefrom.

With respect to claim 2, the Examiner admitted that "Shatz fails to specifically disclose the details of computing 3-D features." (Page 5, Lines 18-21). The Examiner indicated that "it was well known in the art to provide calculating 3-D features by edge-processing a stereo image

to generate a plurality of connected edges, identifying connected edges having lengths greater than a predetermined threshold as features, matching features to generate disparities generated from different images in an image set, and computing 3-D locations of feature points according to the disparities and camera geometry, as taught by Dhond." (Page 5, Line 22 – Page 6, Line 4). Applicants respectfully submit that the Examiner erroneously indicated that Dhond discloses that it is well known to filter out edges based on length for the purpose of decreasing noise. Contrary to the Examiner's characterization, Dhond discloses "a large number of edge operators have been proposed that compute the direction of orientation as well as the strength of an edge..." (Page 1490, Column 1, Lines 29-31). Further, portions of Dhond highlighted by the Examiner recite "...portions of chains having connected points with the magnitude of intensity gradient below a certain threshold were discarded." (Page 1490, Column 2, Lines 49-51). Applicants respectfully submit that none of the referenced portions of Dhond and, to Applicants knowledge none of the disclosure of Dhond, teaches or suggests "identifying connected edgelets having length greater than a predetermined threshold as features..." as particularly claimed in claim 2 (now claim 1 as amended). Applicants submit that since nothing in Dhond teaches or suggests "identifying connected edgelets having length greater than a predetermined threshold as features," it follows that Dhond does not suggest matching said features to generate disparities or computing 3-D locations of features according to said disparities and camera geometry as particularly claimed.

Regarding claim 3, Applicants respectfully submit that the Examiner erroneously indicated that Dhond's description of "applying stereo techniques to trinocular stereo comprising generating depth maps and therefore disparities since depth is calculated from disparity, from a horizontal depth map and a vertical depth map reads on "merging horizontal and vertical disparities to form a set of selected disparities." (Page 6, Line 21 – Page 7, Line 3). Applicants respectfully submit that the referenced portion of Dhond is directed exclusively to trinocular vision. Contrarily, the present invention claims "computing a set of 3-D features from said stereo image. Accordingly, the merging of horizontal and vertical disparities disclosed in Dhond is not analogous to the claimed merging step of claim 3. In particular, nothing in Dhond teaches or suggests "merging horizontal and vertical disparities to form a set of selected disparities..." wherein said disparities are generated by matching features from a stereo image as particularly

claimed. Since nothing in Shatz or Dhond alone or combined teaches or suggests each and every element of claim 1 as amended herein Applicants respectfully submit that the rejections of claims 2, 3, 9, 12 and 17 under 35 USC §103(a) should be withdrawn.

The Examiner rejected claim 5 over Shatz and Dhond in view of admitted prior art found at Page 9, Lines 21-25 of the specification. The Examiner admitted that Shatz and Dhond failed to specifically disclose detecting features by performing a parabolic smoothing step, a non-integral sub-sampling step at a predefined granularity, sobel edge detection step, a true peak detection step, and a chaining step. (Page 8, Line 21-Page 9, Line 1). The Examiner erroneously indicated that this element of claim 5 is taught by prior art admitted in the present specification. Applicants respectfully submit that the referenced section of the specification recites "while there are several methods to perform stereo vision according to the present invention, one such method is outlined below with respect to figure 6." Applicants respectfully submit that nothing in the present specification admits prior art which teaches or suggests this limitation alone or in combination with Shatz and Dhond. Accordingly, Applicants respectfully submit that the rejection of claim 5 under 35 USC §103(a) is improper and should be withdrawn.

The Examiner rejected claims 6, 7, and 8 under 35 USC §103(a) over Shatz in view of Dhond and in view of Pollard et al. ("PMF: A Stereo Correspondence Algorithm Using a Disparity Gradient Limit"), ("Pollard"). The Examiner admitted that "Shatz and Dhond fail to specifically disclose characterizing each of the possible matches by an initial strength of match, by comparing the strength and orientation of the edges and enforcing a smoothness constraint with a pre-selected allowable disparity gradient" (Page 9, Lines 18-20). Applicants respectfully submit that the algorithm disclosed by Pollard uses a disparity gradient limit to perform stereo correspondence and does not teach or suggest anything about the claimed method wherein selected features are identified by connectivity of edgelets having length greater than a predetermined threshold. Since nothing in Shatz, Dhond, Pollard or the three-way combination thereof teaches or suggests each and every element of claims 6, 7, and 8, which depend on claim 1 as presently amended, Applicants respectfully submit that the rejection of claims 6, 7, and 8 under 35 USC §103(a) is improper and should be withdrawn.

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The Examiner rejected claims 4, 11, and 15 under 35 USC §103(a) over Shatz in view of Burschka et al. ("Scene Classification from Dense Disparity Maps in Indoor Environments"), ("Burschka"). The Examiner admitted that "Shatz fails to specifically disclose filtering ground plane noise from the objects." Burschka discloses a method of scene classification in dense disparity maps (Abstract) including generalized ground plane detection. However, Applicants respectfully submit that nothing in Burschka teaches or suggests identifying connected edgelets having length greater than a predetermined threshold as features according to claim 1 as amended herein. Accordingly, Applicants respectfully submit that the rejections of claims 4 and 11 under 35 USC §103(a) should be withdrawn. Applicants respectfully submit that claim 15 is cancelled herein.

The Examiner rejected claim 10 under 35 USC §103(a) over Shatz and Burschka in view of Weng ("Agglomerative Clustering Algorithm"). The Examiner admitted that Shatz and Burschka "fail to specifically disclose breaking chains of features into contiguous segments based on abrupt changes in between successive points" (Page 12, Lines 17-18). However, the Examiner takes Official Notice that this claim element was extremely well known. Applicants respectfully submit that the Examiner's taking of official notice is improper because, contrary to the Examiner's characterization, no means of generally breaking edges into separate objects based on depth values reads on breaking chains of features into contiguous segments based on abrupt changes in a coordinate between successive points. Applicants respectfully traverse the taking of Official Notice and invites the Examiner to provide printed references which support the taking of official notice.

Even if the claimed "breaking" step of claim 10 was well known, Applicants respectfully submit that nothing in the references teaches or suggests combining elements of Shatz and Burshcka along with additional elements not supported by documentation in any way that would result in the combination of elements of claim 10 as particularly claimed. Clearly, the Examiner is improperly using hindsight and Applicants disclosure in formulating such rejections.

The Examiner rejected claim 13 under 35 USC §103(a) over Shatz in view of U.S. Patent No. 6,173,070 to Michael et al. ("Michael"). The Examiner admitted that Shatz fails to specifically disclose converting 3-D features to a ground plane coordinate system, eliminating

features having insufficient distance from the ground plane, projecting remaining features onto the ground plane, converting the projected features to a 2-D image, generating distinct regions, scoring features in the distinct regions, and comparing the region scores to a threshold to determine if an object is present or absent." (Page 13, Lines 18-22). The Examiner indicated that Michael discloses each of these several elements of claim 13. Contrary to the Examiner's characterization, Applicants respectfully submit that the referenced portions of Michael which disclose "estimating a ground plane in a scene, calculating height of a feature relative to a ground plane, eliminating features less than a threshold away from the ground plane, projecting features onto the ground plane..." do not read on "converting said 3-D features to a ground plane coordinate system...". Applicants respectfully submit that nothing in Michael teaches or suggests the claimed step of converting said 3-D features to a ground plane coordinate system. Accordingly, Applicants respectfully submit that the rejection of claim 13 under 35 USC §103(a) is improper and should be withdrawn.

Furthermore, even if Michael did disclose these recited elements of claim 13, no combination of Michael and Shatz teaches or suggests each and every element of claim 13 including the limitations of claim 1 as amended herein. Accordingly Applicants respectfully submit that the rejection is improper and should be withdrawn.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below. The Examiner is invited and encouraged to telephone the undersigned with any concerns in furtherance of the prosecution of the present application.

Please charge any deficiency as well as any other fee(s) which may become due at any time during the pendency of this application, or credit any overpayment of such fee(s) to Deposit Account No. 50-0369. Also, in the event any extensions of time for responding are required for the pending application(s), please treat this paper as a petition to extend the time as required and charge Deposit Account No. 50-0369 therefor.

Respectfully submitted,

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Dated:

Brian L. Michaelis (Reg. No. 34,221)
Customer No. 21710
Attorney for Applicant(s)
BROWN RUDNICK BERLACK ISRAELS LLP
One Financial Center, Box IP
Boston, MA 02111
Tel: 617-856-8329
Fax: 617 856-8201

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